

## NEW SPECIES AND NOTES ON LAURACEAE FROM THE CARIBBEAN LOWLANDS OF COSTA RICA

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In the summer of 1979, intensive collecting was begun toward a flora project for Finca La Selva, a biological field station managed by the Organization for Tropical Studies (OTS) in the Caribbean lowlands of northeastern Costa Rica. This area of approximately 1400 hectares is estimated to harbor at least 1500 species of vascular plants (Hammel & Grayum, 1982). Despite Costa Rica's history of intensive collecting (Prance, 1978), the entire Sarapiquí region, in which the La Selva field station lies, is still relatively unknown botanically (Gentry, 1978). Approximately 50 new species of flowering plants already have been or soon will be described from the station, most of them having come to light through intensive collecting for the flora project. Among these novelties are the four species of Lauraceae here described.

The Lauraceae are mostly tropical in distribution, and the family is particularly well represented in South America. Especially in the New World, revisionary work is sorely needed in order to determine generic limits. At the same time, many more collections and associated field observations are necessary to match fruits with flowers and to determine the variation within species. Eleven of the 17 New World genera are endemic, and 12 genera are known from Central America. The family contains between 2000 and 2500 species worldwide, with about 150 species in Central America (Allen, 1945). A total of 28 species in six genera (*Beilschmiedia* Nees, *Licaria* Aublet, *Nectandra* Rolander, *Ocotea* Aublet, *Persea* Miller, *Phoebe* Nees) are known from the La Selva field station. Eleven of these are also known from South America, and five—here discussed under "Additional Notes"—are shared with the West Indies.

Anyone attempting to identify Lauraceae in the Neotropics soon learns that under the prevailing taxonomy it is often difficult to identify specimens even to genus. This problem is due, in part, to the nature of the plants. They are usually tall trees with inconspicuous flowers, and most species are restricted to primary forest habitats where the individuals are often far apart. Many species are cryptically dioecious (both sexes have apparently "perfect" flowers), and most are seasonal; the fruits take several months to mature, so specimens rarely have both flowers and fruits. As a result, many species are known from few collections, and new species have often been described from incomplete

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material. Thus, the taxonomic references on which we rely are often based on little information.

In addition, characters such as anther-valve orientation, traditionally used to distinguish some genera, may be variable within certain species or even among flowers on an individual. Thus, many large genera as commonly diagnosed and identified are probably not monophyletic (see Kostermans, 1957). The history recorded in publications and on annotation labels demonstrates that even specialists with many years of experience in the family have difficulties. A comment of this sort is almost the standard preface to treatments of the Lauraceae (see Mez, 1889; Allen, 1945; Kostermans, 1952; Bernardi, 1962; Croat, 1978; Howard, 1981).

Given some field experience and herbarium study, many workers would probably agree that much would be gained by merging (at least conceptually) *Nectandra*, *Ocotea*, *Persea*, and *Phoebe* and simply sorting the species. On that basis we might begin to recognize any number of monophyletic supraspecific taxa. Particularly with regard to *Nectandra* and *Ocotea*, actual nomenclatural merger has been advocated (Kostermans, 1957) and, more recently, put into practice (Howard, 1981). However, for the few species at La Selva, the traditional generic distinctions are rather clear and appear to provide meaningful groupings of species. Thus, I choose to recognize the two genera, but for practical purposes in my treatment of the Lauraceae for the Flora of La Selva, I include the species together under one key, in which they are sorted without reference to generic characters.

The descriptions and observations presented in this paper are based on two years of field work at La Selva and examination of the Lauraceae holdings at CR, DUKE, F, NY, and US, as well as selected specimens from GH, LL, MICH, and MO.

## NEW SPECIES

***Licaria sarapiquensis* Hammel, sp. nov.**

FIGURE 1.

Arbor 6–20 m. Folia alterna, elliptica, 15–20 × 5–7 cm, apice anguste acuminata, basi acuta, omnino glabra; supra atroviridia nitida. Paniculae sparsiflorae, ramis gracilibus, ramis ultimis umbelliformibus. Flores urceolati vel globosi, 2.3–2.5 mm longi, tepalis erectis vel incurvatis sub anthesi; antherae filamentis breviores, dehiscentia apicalis et extrorsa; glandulae claviformes, filamentis subaequilongae; staminodia ligulata tenuia, staminibus externa, filamentis subaequilonga. Fructus ovoideus, ca. 2 cm longus; cupula tenuiter duplomarginata.

Tree 6–20 m tall, 5–20 cm dbh; bark gray to nearly black, the inner bark thin, yellow, with strong, distinctive fragrance of sassafras. Leaves alternate; petiole 0.5–1 cm long; blade elliptic, 15–20 by 4.5–7 cm, the tip narrowly caudate, 1–3 cm long, the major lateral veins 5 to 7, arising at 50–75° angle, distinctly loop connected, the minor venation reticulate, prominent on both surfaces but more so below in dried material, the upper surface dark green, shiny, the lower surface dull, paler. Inflorescences paniculate, 2.5–4 cm long,



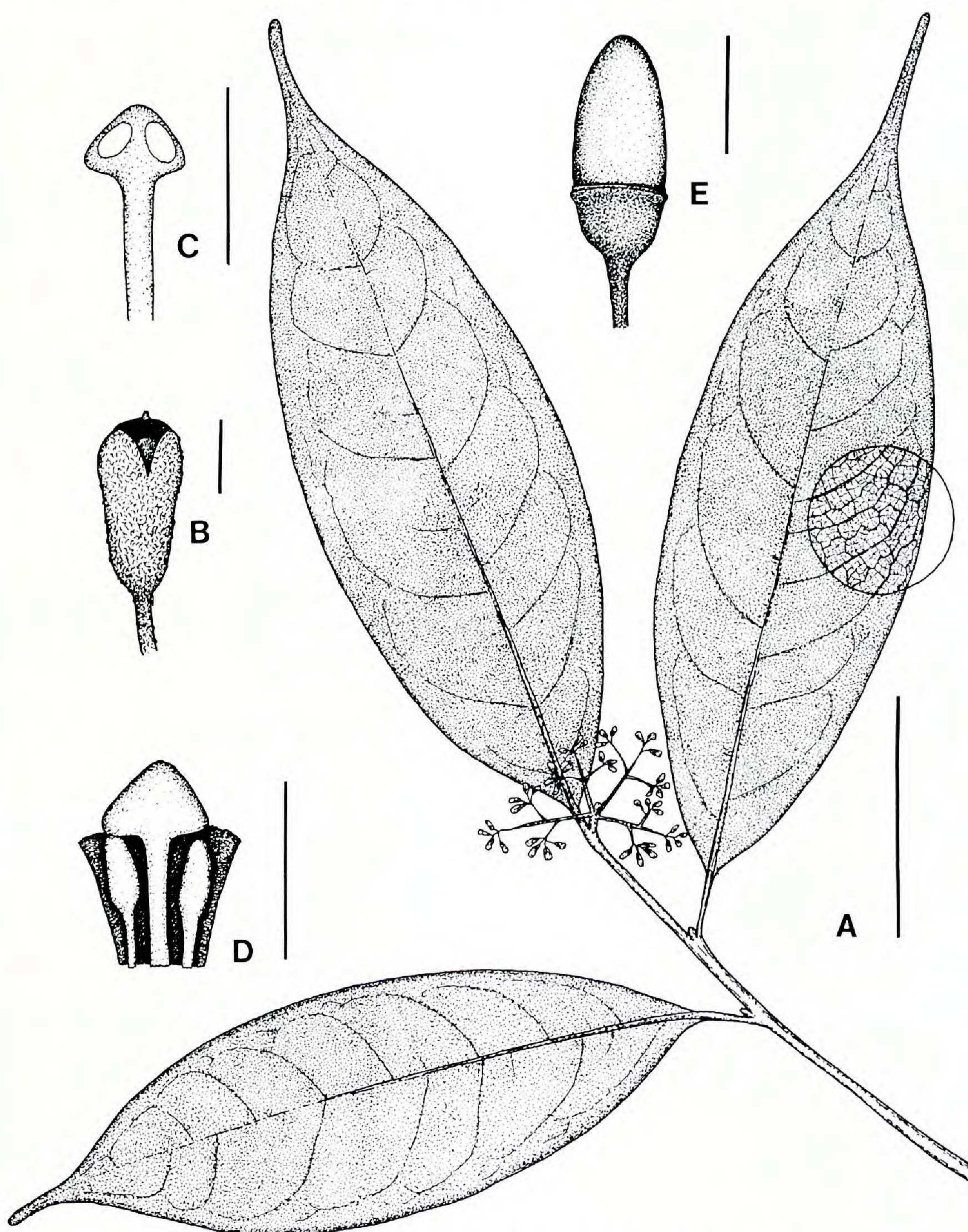


FIGURE 1. *Licaria sarapiquensis*: A, habit, scale = 5 cm; B, flower, scale = 1 mm; C, stamen, abaxial view, scale = 1 mm; D, stamen with basal glands on background of staminodia, adaxial view, scale = 1 mm; E, fruit, scale = 1 cm. (A from *Hammel 12235*, B–D from *Hammel 8663*, E from *Hammel 10532*.)

very slender branched and sparsely flowered, the ultimate clusters of flowers umbelloid, glabrous. Flowers urceolate to globose, 2.3–2.5 mm long, yellow-green, very inconspicuous; tepals ligulate, 1.2 mm long, about as long as floral tube, patent or curved inward at anthesis; inner 3 stamens fertile, 1.2 mm long, the anthers much shorter than filaments, oblate depressed, the valves opening



apically and somewhat extrorsely, the filaments 1 mm long, the glands stipitate, equaling filaments in length, with stipe as long as body of gland; outer 6 stamens sterile, membranous, ligulate; staminodia about same length as floral glands; ovary more or less pyriform, style and ovary together 1.8 mm long. Fruits ovoid-ellipsoid, 2 cm long, 0.8 cm in diameter, black at maturity, lower  $\frac{1}{3}$  covered by conical, thinly double-margined red cupule. Flowering in mid-May; fruits maturing in late August. Known only from Costa Rica.

TYPE. Costa Rica, Heredia, Finca La Selva, on Río Puerto Viejo just E of junction with Sarapiquí, elev. ca. 100 m, 14 May 1980, *Hammel 8663* (holotype, DUKE; isotypes, CR, DUKE, F, MO).

ADDITIONAL SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: Finca La Selva, *Hammel 10532* (DUKE), *12235* (DUKE), *Hartshorn 1588* (CR).

*Licaria* Aublet is the only genus of Lauraceae in Central America with just three fertile stamens. It is also distinctive in having two rather than four valves per anther and a double-margined fruit cupule.

All of the flowering individuals of this species seen at La Selva were slender understory treelets about 6–12 m tall and 5–10 cm dbh. They often appeared dependent on nearby trees for support and were not observed to set fruit. The one fruiting individual found at La Selva (*Hammel 10532*) was a stout mid-canopy tree ca. 20 m tall. Although the flowers of the small individuals appeared to be perfect, these plants may be functionally staminate until reaching a certain size. The occurrence of a similar phenomenon has been verified for at least one species of Lauraceae; quantitative data from a large population of *Ocotea tenera* Mez at Monte Verde, Costa Rica, indicate a definite relationship between size and sex in this dioecious species (Wheelwright, pers. comm.).

The leaves of *Licaria sarapiquensis* are very distinctive in having long-acuminate tips and shiny, dark green upper surfaces (retained even in dried material). In this respect, as well as in details of the fruits, the species is remarkably similar to *L. armeniaca* (Nees) Kosterm., of South America. However, the tepals of *L. armeniaca* are much larger and reflexed, the filaments are indistinct from the anthers, and the floral glands are larger and tepaloid.

In Kostermans's (1937) treatment this new species would key to *Licaria pucheri* (Ruiz & Pavon) Kosterm., also of South America. However, the leaves of *L. pucheri* are not long acuminate, the basal glands are sessile and smaller, and the cupule margins are much wider than those of *L. sarapiquensis*.

This new species superficially resembles *Licaria guatemalensis* Lundell, but details of its leaves, flowers, and fruits suggest a closer relationship to the South American *L. armeniaca* than to any known Central American *Licaria*.

The epithet for this species is taken from the Sarapiquí region of Heredia Province, in which La Selva lies.

***Nectandra hypoleuca*** Hammel, sp. nov.

FIGURE 2.

Arbor 10–15 m. Folia elliptica 17–27 × 6.5–10 cm, apice acuminata, basi acuta, glabra, praeter subtus pilis in axillis nervorum costa et nervis planis vel leviter impressis, griseoviridia supra, glauca subtus. Stamina externa subses-



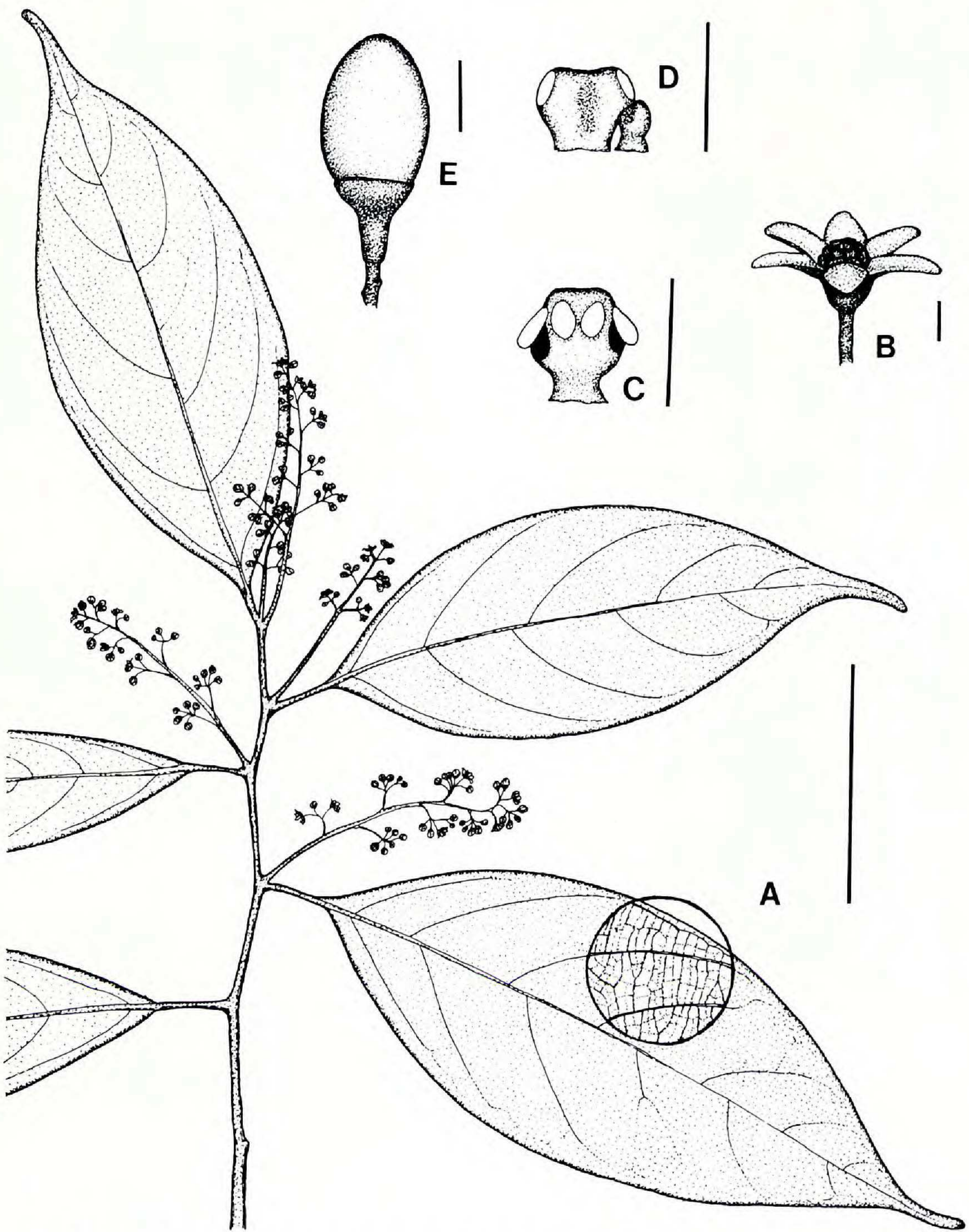


FIGURE 2. *Nectandra hypoleuca*: A, habit, scale = 5 cm; B, flower, scale = 1 mm; C, outer stamen, adaxial view, scale = 1 mm; D, inner stamen with staminodium, adaxial view, scale = 1 mm; E, fruit, scale = 1 cm. (A from *Hammel 9111*, B–D from *Hammel & Trainer 13074*, E from *McDowell 601*.)

siles, valvulis uniseriatis; staminodia 0.4 mm longa. Fructus ovoideus, 1.5–2.5 cm longus; cupula ca. 0.7 cm lata et alta.

Tree 5–15 m tall, 10–30 cm dbh; bark surface dark brown. Leaves with petiole 0.75–1.5 cm long; blade elliptic, 17–27 by 6.5–10 cm, the apex acuminate, the base acute, the midrib plane to somewhat impressed above, prom-



inent below, the major lateral veins 5 to 7, arising at 30–60° angle, plane or slightly impressed above, the upper surface dull, drying grayish green, glabrous, the lower surface usually glaucous and glabrous except for densely brown-pubescent domatia in vein axils. Inflorescences paniculate, axillary, clustered toward branch ends, 8–18 cm long, rachis sparsely pubescent. Flowers ca. 5 mm wide, sparsely pubescent; tepals ligulate, 2–2.4 mm long, spreading and bright white at anthesis; outer 6 stamens nearly sessile, quadrate, somewhat emarginate, 0.6–0.8 mm long, the anther valves arranged in low arc or horizontal line, outer 2 lateral; staminodia clavate, ca. 0.4 mm tall; ovary globose, ca. 0.6 mm long, style slightly shorter. Fruits ovoid, 1.5–2.5 cm long, 0.5 cm in diameter; cupule conical, ca. 0.7 cm tall, 0.7 cm in diameter. Flowering most commonly in June but also in early November; fruits maturing by October. Known only from Costa Rica.

TYPE. Costa Rica, Heredia, Finca La Selva, on Río Puerto Viejo just E of junction with Sarapiquí, elev. ca. 100 m, 23 June 1980, *Hammel 9111* (holotype, DUKE; isotypes, CAS, CR, F, MICH, MO, NY).

ADDITIONAL SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: Finca La Selva, *Grayum 1482* (DUKE), *Hammel 8864* (DUKE), *10073* (DUKE), *10348* (DUKE), *Hammel & Trainer 12840* (DUKE), *12848* (DUKE), *13074* (DUKE), *Hartshorn 950* (CR), *1751* (CR), *McDowell 601* (DUKE).

This species has the outer six stamens each with four anther valves in a low arc or horizontal line, the tepals spreading or reflexed and ligulate, and the fruits with a definite cupule. Thus, it can be clearly placed within *Nectandra*.

*Nectandra hypoleuca* is known only from the La Selva field station, where it is frequent in the old secondary woods and alluvial forest along the Río Puerto Viejo. It can be recognized by its gray-green leaves, which are strikingly silvery-white (glaucous) below. This feature is particularly obvious on the leaves of saplings and in new leaves but is also present on mature ones. A sweet coconut fragrance perfumes the air when these plants burst into flower.

This new species is probably closely related to *Nectandra woodsoniana* Allen, of El Salvador, Costa Rica, and Panama, which differs primarily in its leaves that are not glaucous and that have the secondary and tertiary venation elevated on the upper surface, and its staminodia that are larger.

Bernardi (1967) placed *Nectandra woodsoniana* in synonymy under *N. martinicensis* Mez. With regard to the latter name, I have examined only the isotype at MO, *Sieber 99*. In addition to the above features, it differs markedly from *N. hypoleuca* in having shiny, conspicuously pellucid-punctate leaves.

The epithet for this new species refers to the white lower surface of the leaves.

### ***Ocotea hartshorniana* Hammel, sp. nov.**

FIGURE 3.

Arbor 20–30 m, radices grilliformes ferens. Folia oblonga, 12–19 × 3.5–7 cm, supra in medio latissima, apice abrupte acuminata, basi acuta lamina decurrenti, supra nitida, subtus pubescentia pilis erectis, glauca; costa basi latior; pubescentia ferruginea. Staminodia nulla. Fructus cylindricali-ovoideus, apiculatus, ca. 2 cm longus; cupula ca. 1.5 cm longa.



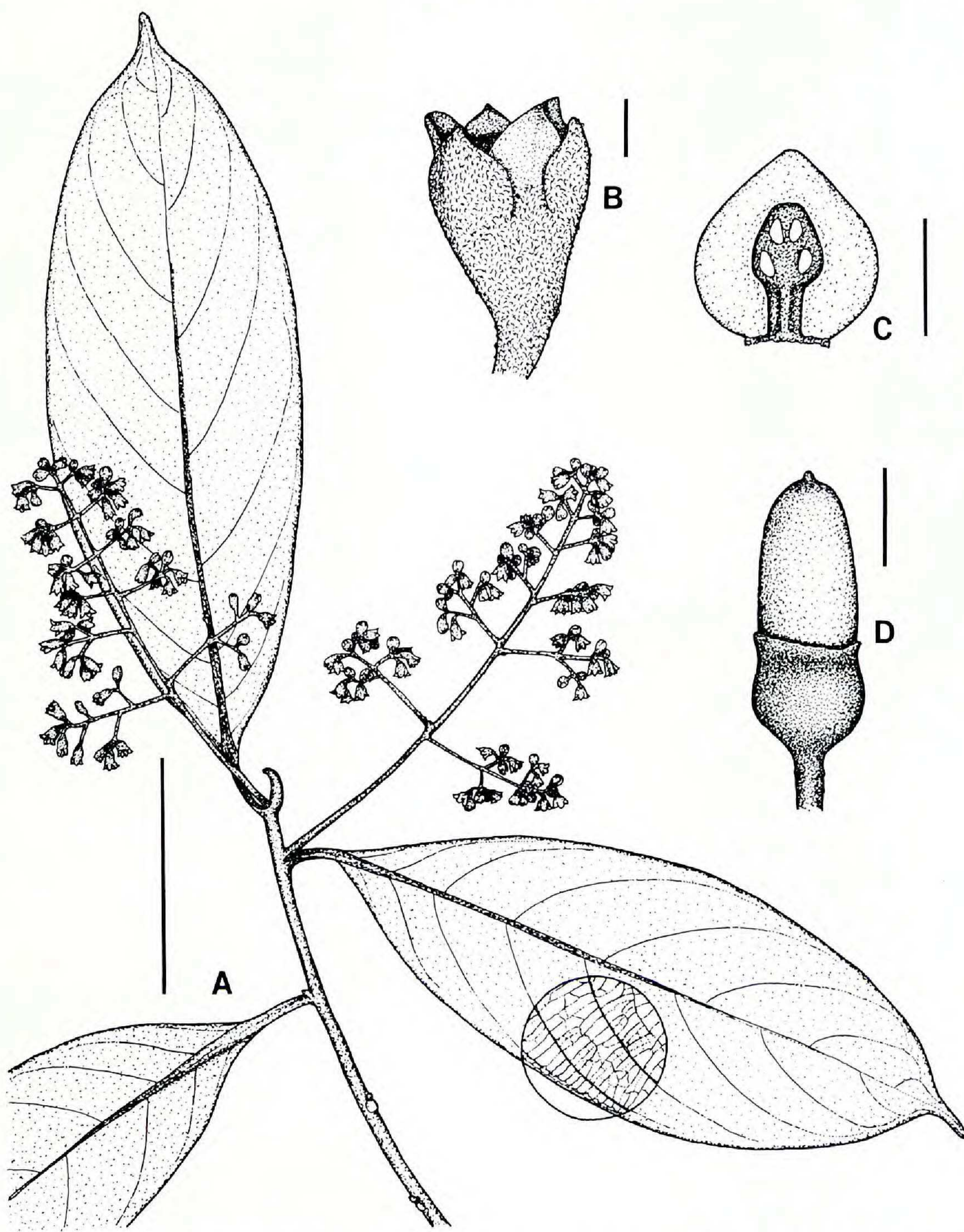


FIGURE 3. *Ocotea hartshorniana*: A, habit, scale = 5 cm; B, flower, scale = 1 mm; C, tepal and outer stamen, adaxial view, scale = 1 mm; D, fruit, scale = 1 cm. (All from Hammel 11932.)

Tree 20–30 m tall, 40–100 cm dbh; surface of bark pinkish tan, inner bark pink; trunk usually with stout adventitious roots. Leaves with petiole 0.5–1.5 cm long, flattened; blade obovate, 12–19 by 3.5–7 cm, the apex abruptly acuminate, the base acute, decurrent, the margin often slightly revolute, the midrib plane above, tomentulose, the lateral veins also plane or slightly impressed



above, rusty pubescent and prominent below, the tertiary venation reticulate and conspicuous on both surfaces, the major lateral veins usually 6 to 8, arising at 30–40° angle, the upper surface glabrous, shiny, the lower surface soft pubescent with erect hairs, glaucous (canopy leaves). Inflorescences axillary, paniculate, clustered among distal leaves, 12–15 cm long, densely flowered; rachis rusty pubescent. Flowers 3 mm long, rusty pubescent; tepals triangular, 1.6–2 mm long, erect at anthesis; outer stamens 1.2 mm long, the anthers triangular, slightly longer than pubescent filaments; staminodia lacking; ovary pyriform, narrowed at base, 1.5 mm tall, the style 1 mm long, the stigma peltate. Fruits ovoid-cylindrical, ca. 2 cm long, 1 cm in diameter, obtuse, apiculate, green at maturity; cupules urceolate, ca. 1.5 cm long, brownish, covering lower  $\frac{1}{3}$  of fruit. Flowering and fruiting April and May. Known from Costa Rica and Ecuador.

TYPE. Costa Rica, Heredia, Finca La Selva, on Río Puerto Viejo just E of junction with Sarapiquí, elev. ca. 100 m, 2 May 1982, *Hammel 11932* (holotype, DUKE; isotypes, CAS, CR, F, MICH, MO, NY, US).

ADDITIONAL SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: Finca La Selva, *Folsom 9930* (DUKE), *Hammel 10630* (DUKE), *Hartshorn 1140* (MO), *1218* (MO), *1638* (MO), *Neil 5122* (DUKE, MO), *D. Smith 245* (DUKE). ALAJUELA: ca. 2 km S of Colonia Blanca, elev. 700–800 m, *Utley & Utley 5407* (DUKE). SAN JOSÉ: La Hondura, elev. 1300–1700 ft, *Standley 36330* (US); San Pedro de la Calabaza, elev. 1100 m, *Cooper 10330* (US). **Ecuador.** ESMERALDAS: Río Hoja Blanca con Río Hualpi, elev. 75 m, *Little & Dixon 21067* (US).

This species is placed in *Ocotea* because of its broadly triangular tepals that are erect at anthesis, its nine fertile stamens with the anther valves arranged in a narrow arc or two columns, and its fruit with a cupule.

At La Selva this species is quite conspicuous, although it is apparently restricted to the alluvial forest near the Río Puerto Viejo. Juvenile plants are common and are very distinctive because of their tiered growth form and their reddish orange new leaves with rusty-red pubescence. Mature plants usually have stout adventitious prop roots, apparently an unusual feature in the Lauraceae. This species does not appear to be dioecious; I observed no individuals that produced flowers but no fruits. The anthers of plants seen to produce fruits contained pollen.

*Ocotea hartshorniana* is probably closely related to *O. caracasana* (Nees) Mez (= *Nectandra hypoglauca* Standley ex Allen; holotype, Panama, *Davidson 531* (F!)), which also occurs at La Selva. Both have prop roots, and they are similar in details of venation, pubescence, flowers, and fruits. *Ocotea hartshorniana* differs primarily in its lack of staminodia and in its redder pubescence, which is more erect, especially on the lower surface of the leaf. A third species with prop roots, *O. mollifolia* Mez & Pittier ex Mez, of Costa Rica, is also known from La Selva and shares some features of pubescence, flowers, and fruits with the above two species. It differs in having shorter, unwinged petioles and broader leaves that are not glaucous below.

This new species is named to honor Gary Hartshorn, whose initial efforts and continued support toward uncovering the tremendous diversity of plants at La Selva provided the original basis and stimulus for the flora project.



***Phoebe chavarriana* Hammel, sp. nov.**

FIGURE 4.

Arbor 10–15 m. Folia alterna grandissima, elliptica, 25–50 × 10–23 cm, apice et basi acuta vel fere rotunda, omnino glabra, nervatura pinnata paribus nervorum ca. 8–10, subtus ut videtur glauca; petioli ca. 3.5–4.5 cm longi. Fructus ovoideus, ca. 1.5–1.8 cm longus; cupula tenuis vadosa.

Small tree 10–15 m tall, 15–25 cm dbh; surface of bark reddish brown, marked with long, horizontal lenticels, warty, the inner bark marbled tan and white, slowly oxidizing orange, very fragrant of avocado. Leaves with petiole (2–)3.5–4.5(–6) cm by 3–5 mm, channeled above, reddish; blade elliptic, 25–50 by 10–23 cm, usually slightly more than 2 times longer than wide, coriaceous, the base and apex acute to obtuse, the midrib impressed above, prominent below, the venation strictly pinnate, with the (6 to ) 8 to 10 major lateral veins borne at 45–50° angle and as much as 4–5(–12) cm apart, the upper surface satiny, glabrous, the lower surface dull, much paler, appearing glaucous due to papillose epidermal cells, glabrous. Inflorescences paniculate, axillary, clustered near branch tips, 12–23 cm long; rachis nearly glabrous to sparsely short appressed pubescent. Flowers 2.5–3.2 mm long; nearly glabrous to sparsely appressed pubescent; tepals 2.3–2.4 mm long, greenish white, outer whorl as long as or slightly shorter than inner; outer stamens 1.7–1.9 mm long, the filaments ca. ½ length of anthers, sparsely pubescent; staminodia broadly cordate, 1.2 by 0.8–1 mm, stipitate, sparsely pubescent; ovary globose, equal in height to style, both glabrous. Fruits ovoid, 1.5–1.8 cm long, 1–1.2 cm in diameter, dark green to almost black at maturity; cupule thin, shallow, the margin lobed from persistent, accrescent tepals, the fruiting pedicel conical, 1–1.5 cm long, somewhat thickened, red. Flowering April and May; fruits maturing in late July. Known only from the Caribbean lowlands of Costa Rica.

TYPE. Costa Rica, Heredia, Finca La Selva, on Río Puerto Viejo just E of junction with Sarapiquí, elev. ca. 100 m, 2 May 1982, *Hammel 11931* (holotype, DUKE; isotypes, CR, F, MO).

ADDITIONAL SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: Finca La Selva, *Grayum 2767* (DUKE), *Hammel 9287* (DUKE), *Hammel & Trainer 12922* (DUKE), *Hartshorn 1289* (CR); along Río Peje ca. 2 km S of Finca La Selva western annex, elev. ca. 150 m, *Hammel 11679* (DUKE).

This species is placed in the genus *Phoebe* because of its large, stipitate staminodia and its definite, although thin and shallow, fruit cupule.

*Phoebe chavarriana* is found scattered in primary forest at La Selva, most often on slopes and ridges. It has also been collected in primary forest along the Río Peje south of the La Selva property. Its extremely large, glabrous, pale green leaves distinguish this species from all other Lauraceae in the region. Although the leaves appear to be glaucous below, the effect is due to the refractive nature of the papillose epidermal cells rather than to any kind of waxy coating. The flowers of this species apparently lack fragrance at anthesis.

Although the flowers of *Phoebe chavarriana* are similar in detail to those of *Persea pallida* Mez & Pittier and *Persea rigens* Allen, the fruits are characteristic of the genus *Phoebe*. While fruits of *Persea* lack a cupule, those of *Phoebe*



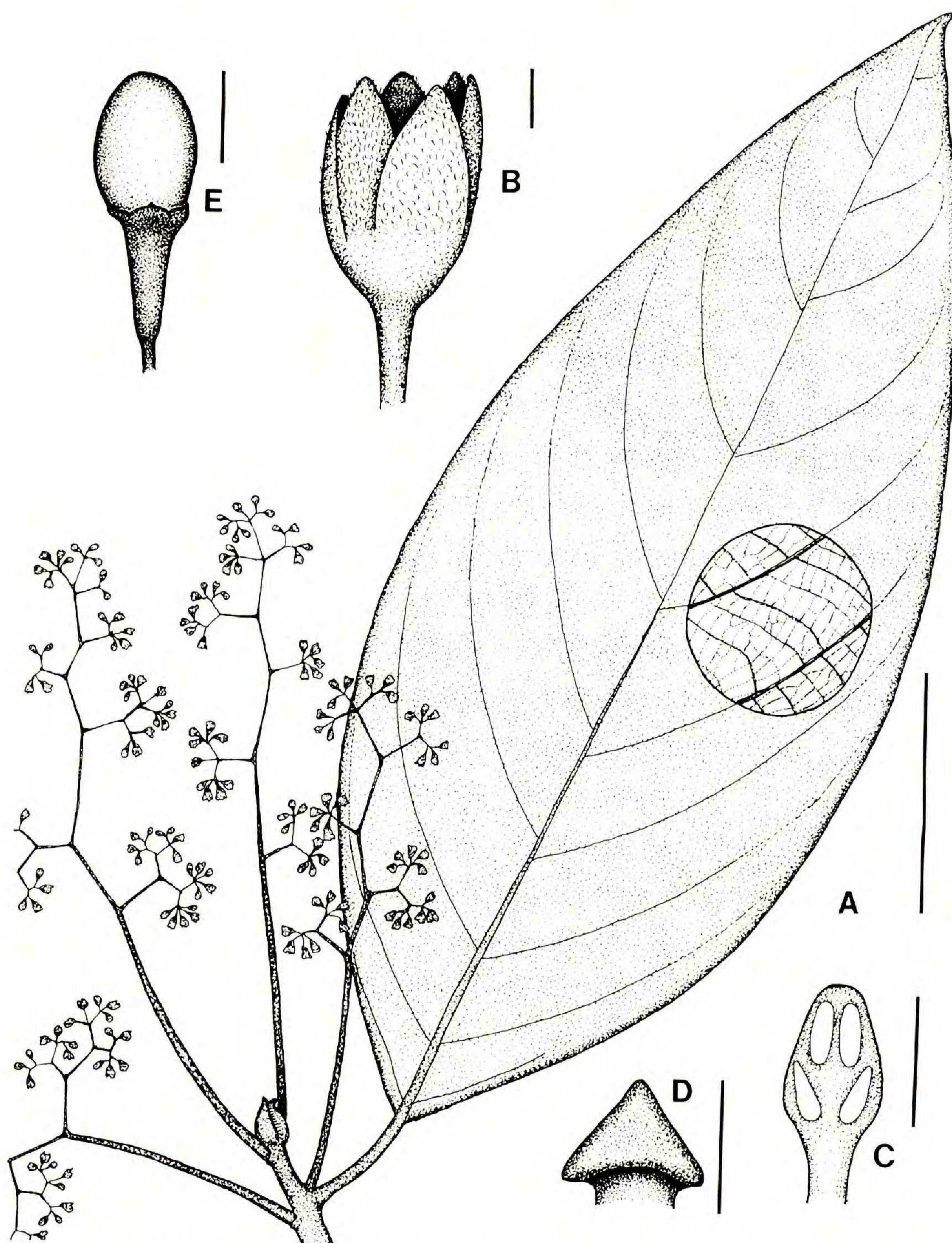


FIGURE 4. *Phoebe chavarriana*: A, habit, scale = 5 cm; B, flower, scale = 1 mm; C, outer stamen, adaxial view, scale = 1 mm; D, staminodium, scale = 1 mm; E, fruit, scale = 1 cm. (A from Hammel 11931, B-E from Hammel 9287.)

*chavarriana* are borne atop an enlarged, conical pedicel on a shallow cupule fringed by the persistent, accrescent tepals; they differ only in size from those of the widespread *Phoebe cinnamomum* (= *Phoebe mexicana* Meissner). Except for its subtriplinerved and smaller leaves, this latter species bears a strong resemblance to *P. chavarriana*, and the two are probably closely related.

This new species of *Phoebe* is named in memory of Rafael Chavarria, who



first came to the Sarapiquí lowlands on horseback and then to the forest by foot on trails where roads and bridges lie now. He worked for 20 years as foreman and boatman at Finca La Selva. Don Rafael was an ardent conservationist and loved the forest.

#### ADDITIONAL NOTES: AFFINITIES WITH WEST INDIAN PLANTS

All of the genera of Lauraceae at the La Selva field station also occur in the West Indies. In addition, the genus *Aniba*, which has been found very near La Selva and which was once thought restricted to the West Indies and South America, is here reported from Costa Rica and Panama. Five of the 28 species of Lauraceae found at the La Selva field station are also known from the West Indies. Bernardi (1967) has detailed the synonymy and the occurrence in Central America of one of these, *Nectandra membranacea* (Sw.) Griseb. The other four merit further discussion.

**Aniba** Aublet, Hist. Pl. Guiane Franç. 1: 327, 2: t. 126. 1775.

Although *Aniba* has previously been reported from Central America, the species involved have since been placed in other genera, and recently this genus has been considered restricted to the West Indies and South America (Kubitzki, 1982). However, collections from forest just a few kilometers south of the La Selva field station have revealed a new species of *Aniba*, probably related to *A. intermedia* (Meissner) Mez (Kubitzki, pers. comm.). A second species occurs in Darién province of Panama.

SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: near Chilamate, Finca Bejuco, *Hammel* 13366 (CR), *Hammel & Trainer* 13111 (DUKE). **Panama.** DARIÉN: *Duke* 4918 (NY), 13569 (NY), *Stern et al.* 114 (NY), 750 (NY).

**Licaria triandra** (Sw.) Kosterm. Rec. Trav. Bot. Néerl. 34: 588. 1937.

*Laurus triandra* Sw. Prodr. Veg. Ind. Occ. 65. 1788.

According to published accounts (e.g., Mez, 1889; Kostermans, 1937; Allen, 1945; Bernardi, 1962), this species has been regarded as restricted to the West Indies. Recently, however, H. Kurz has annotated many Central American collections as *Licaria triandra*. The plants at La Selva differ from other Central American collections in their smaller, more acuminate leaves and their narrower cupule margins. In these respects the La Selva plants actually resemble collections of this species from the West Indies more than they do those from Central America.

SPECIMENS EXAMINED. **Costa Rica.** HEREDIA: La Selva, *Hammel* 11036 (DUKE), *Hammel & Trainer* 10802-A (DUKE), *Hartshorn* 1105 (NY), *Holdridge* 5249 (NY).

**Ocotea floribunda** (Sw.) Mez, Jahrb. Königl. Bot. Gart. Berlin 5: 325. 1889.

*Laurus floribunda* Sw. Prodr. Veg. Ind. Occ. 65. 1788.

*O. wachenheimii* Benoist, Bull. Mus. Hist. Nat. (Paris) 30: 510. 1924.

*O. arenaensis* Brooks, Kew Bull. 5: 217. 1933.



The very fine reticulate venation of the leaves, the broad tepals, and the perfectly globose fruits borne on thick discoid cupules are unusual in *Ocotea* and make this species easily recognizable, even on herbarium sheets.

Although *Ocotea floribunda* is common in the West Indies, it is quite rare in Central America. Until recently, it was known from just three collections—two from Nicaragua (cited by Mez, 1889) and one from Costa Rica, *Tonduz 12876* (US!) (correctly identified by Pittier). Its rarity probably accounts for the fact that neither Standley (1937) nor Allen (1945) included this very distinctive species in their treatments.

The name *Ocotea wachenheimii* has been applied to South American specimens that appear to differ from the West Indian and Central American plants only in geographic origin. Although Bernardi (1962) recognized both species, his key does not actually distinguish them: the cupule of *O. floribunda* is said to be double margined; that of *O. wachenheimii*, completely flat and disk shaped. His descriptions, however, suggest that both species have flat, double-margined cupules. My own observations indicate that the cupules of fresh material from La Selva are indeed flat but not double margined; any suggestion of a double margin is an artifact of drying and not at all reminiscent of the condition in, for example, most *Licaria* species. From these observations and examination of herbarium specimens, evidence for maintaining *O. wachenheimii* distinct from *O. floribunda* is lacking.

Collections of this species from the West Indies do tend to have somewhat smaller leaves than those from Central and South America. However, it would be difficult, at best, to deduce the place of origin of any particular specimen from its morphology.

CENTRAL AMERICAN SPECIMENS EXAMINED. **Costa Rica.** GUANACASTE: Monte Verde, *Dryer 1599* (CR); Rincón de La Vieja, *Judziewicz 4300* (CR). HEREDIA: rd. to Río Sucio, *Hartshorn 1563* (CR); La Selva, *Hammel 8914* (DUKE), *9705* (DUKE), *11170* (DUKE), *Hartshorn 1351* (CR). CARTAGO: near Turrialba, *Holdridge 6739* (CR). PUNTARENAS: near Panama border, *Hartshorn 2165* (CR); Tucurrique, *Tonduz 12876* (US).

***Ocotea leucoxylon* (Sw.) De Lanessan, Pl. Utiles Colon. Franç. 156. 1886.**

*Laurus leucoxylon* Sw. Prodr. Veg. Ind. Occ. 65. 1788.

*Ocotea lenticellata* Lundell, *Wrightia* 5: 54. 1974. TYPE: Guatemala, *Gentle 9924* (holotype, LL!; isotype, DUKE!).

*Ocotea lasseriana* C. K. Allen, *Mem. New York Bot. Gard.* 10: 90. 1964. TYPE: Venezuela, *Lasser 1868* (holotype, F!; isotype, US!).

The warty cupules, distant rather than clustered inflorescences, gray-green leaves, and unusual scaly lower-leaf surfaces make *Ocotea leucoxylon* very easy to recognize even on herbarium sheets. It is partly on the basis of these features that synonymy with *O. lenticellata* of Guatemala and *O. lasseriana* of Venezuela is here established. *Ocotea duotincta* Allen, also of Venezuela, seems very closely related, differing only in its brownish pubescence. *Ocotea leucoxylon* was formerly thought to occur only in the West Indies. The collections cited below from Guatemala and Belize were originally distributed as *Ocotea mayana* (Lundell) Lundell and probably are still labeled with that name in most her-



baria. Lundell later recognized this material as belonging to a species distinct from the type of *O. mayana* (Gentle 3187 (holotype, MICH!)) and gave it the name *O. lenticellata*.

Howard (1981) traced the history of uncertain authorship for the combination *Ocotea leucoxylon* and concluded that Mez (1889) should be cited as the correct author. However, the rejection of *Ocotea leucoxylon* (Sw.) De Lanessan, an earlier combination for this same species, seems unjustified. De Lanessan (1886) did not cite Swartz, author of the basionym, but referred to Grisebach, who under *Oreodaphne leucoxylon* Griseb. (1864) did refer to the basionym and its author, Swartz. Clearly, De Lanessan was referring to this same species since the essential features of his description translate directly from Grisebach. Although this is a very indirect reference, it does lead back to *Laurus leucoxylon* Sw. Since the current ICBN Article 33.2 requires a complete and direct reference only for new combinations made after 1953, De Lanessan, whose work was published three years prior to that of Mez, should be given credit for the combination.

CENTRAL AMERICAN SPECIMENS EXAMINED. **Guatemala.** IZABAL: Puerto Mendez, *Contreras* 9914 (LL), 9924 (LL), 10071 (DUKE), 10075 (LL, US), 10291 (DUKE); El Estor, *Contreras* 11364 (LL, US), 11367 (DUKE); Cadenas, *Lundell & Contreras* 19037 (LL). **Belize.** STANN CREEK: Humming Bird Hwy., *Gentle* 8811 (LL). **Costa Rica.** HEREDIA: La Selva, *Grayum* 2388 (DUKE), *Hammel* 10912 (DUKE), 11058 (DUKE), 11928 (DUKE), *Hammel & Trainer* 12957 (DUKE), 13123 (DUKE), *D. Smith* 484 (DUKE). **Panama.** PANAMÁ: near Goofy Lake, Cerro Azul, 3 July, *Croat s.n.* (CR); Cerro Jefe, *D'Arcy & Sytsma* 14748 (MO), *Sytsma & Antonio* 2325 (MO); El Llano—Cartí road, *Mori et al.* 4150 (MO).

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